

areas acquired here and there would not be satisfactory for any purpose unless woven into a more complete system by the teacher. An interesting experiment is the inclusion of additional exercises, which are based upon descriptions extracted from the volumes of the Highways and Byways Series. They are well chosen to illustrate the different types of English scenery, and should be a useful link between æsthetic appreciation and exact observation.

OUR BOOK SHELF.

Carburettors, Vaporisers, and Distributing Valves used in Internal Combustion Engines. By E. Butler. Pp. xi + 176. (London: C. Griffin and Co., Ltd., 1909.) Price 6s. net.

MR. BUTLER has written an interesting book on a subject which hitherto has not had justice done to it; and he is to be congratulated upon his bold decision to devote a book exclusively to these matters of detail instead of compressing them into the small space that can be spared in books dealing with internal combustion engines in their complete form. It cannot, of course, replace the completer treatises, but it is an excellent adjunct to them and is evidently written by one who is thoroughly familiar with this side of the work.

The volume contains twelve short chapters, of which the first four are concerned with surface and spray carburettors for petrol and alcohol motors, carburettors capable of automatically adjusting the air and petrol supplies over a wide range of speed, and various types of vaporisers for use with the heavy oils forming the second distillate from petroleum. The remainder of the book includes descriptions of various forms of admission and exhaust valves used on all classes of internal-combustion engines, together with some discussion of methods of actuating, timing, and water-cooling them.

Mr. Butler is an inventor on these lines, and has made himself familiar with what others have done in the same field; thus there are illustrations of no fewer than fifty-two different kinds of carburettor and vaporiser. With so much study of these matters, we wonder to find that he is apparently unaware of the increasingly common practice with motor vehicles of using the heat of the exhaust gases to warm, not the mixture as a whole, but the air supply only. The warm air is then passed over the jet and all the other arrangements are as usual. At least equal economy is obtained in this way besides greater ease of fitting and a lowering of the prime cost. Even with so simplified a form of carburettor or vaporiser as this makes, it has been found that the cylinders do not require cleaning out at any more frequent intervals.

As regards the valve mechanisms, we are glad to find that the author has included a description of the Knight engine, and, further, that he has given a good deal of space to the discussion of sliding and rotary valves. We cannot but feel that the poppet type of valve is unlikely to be permanently used, and the author deserves our thanks for having taken us some steps along the road towards a better form of valve mechanism. Many motor manufacturers are working in the same direction, and there is no doubt that we shall soon be hearing of other suggested forms of valve. If the experience of extended use of the Knight engine is favourable, it will give great impetus to this development. With the largest forms of gas engine there are, of course, already many engines now running with complete success, using slide valve forms of control for either the admission or exhaust ports, or for both.

Cotton Spinning Calculations. By W. S. Taggart. Pp. xiv + 335. (London: Macmillan and Co., Ltd., 1909.) Price 4s. net.

THE author of this excellent and beautifully printed text-book assumes that the reader has no special equipment beyond an elementary knowledge of arithmetic, and some acquaintance with the various processes of cotton manufacture and the technical nomenclature used in connection therewith. In the introductory chapter, he gives general calculations respecting the velocity ratio in wheel trains and belt gearing; the surface velocities of rollers and the stretching of fibres resulting from "draft"; the estimation of "hanks" and "counts"; and the force actions of levers. A set of exercises closes this part. In succeeding chapters the treatment is more direct and special. The various machines through which the material passes, from the Scutcher to the Ring Spinning Frame, are considered in detail. The author has had the assistance of the leading manufacturers of textile machinery in the cotton district, and is thus able to give diagrams, drawings, and tables of wheel teeth, showing very clearly with full details the mechanisms used in all the standard types of machines. The calculations are therefore based on numbers representing the best modern practice. A special chapter is devoted to the consideration of epicyclic or differential gears and the design of cone drums. Thus, by repetition, and by the wealth of illustration provided, no reader should fail to obtain a thorough insight into the action of the most complicated of the mechanisms. This kind of quantitative work is essential if a student is to have anything more than a superficial knowledge of the subject, and it will enable him readily to calculate the wheel changes, &c., necessary in order that a machine shall be able to cope with the varying demands made upon it.

The author concludes his very interesting volume with a number of useful tables and an index. Both author and printers are to be congratulated on the production of this admirable work, which should be in the hands of everyone, at home and abroad, who is interested in the practical working of textile machinery.

Proceedings of the Aristotelian Society. New series, Vol. ix. Pp. 259. (London: Williams and Norgate, 1909.) Price 10s. 6d. net.

OF the nine articles contained in this volume the most important are, perhaps, Prof. Alexander's essay on "Mental Activity in Willing and Acting," and Prof. Stout's rejoinder, "Are Presentations Mental or Physical?" The point at issue in these papers is one of fundamental importance for both psychology and the theory of knowledge, since Prof. Alexander's contention, to put it quite plainly, is that all mental activity consists solely of conation and feeling, or possibly, since it is conceivable that the feeling or affective side of mental life may be reducible to experience of successful and thwarted conation, of conations alone. Hence he refuses to admit the existence of such cognitive processes as have usually been supposed to be denoted by the names sensation, imagination, perception. On his view the *object* apprehended in all these processes is physical; the *process* involved is simply conation directed towards a specific physical object. It follows, of course, that if Prof. Alexander makes out his case, "presentations" must be deleted entirely from our account of the stuff out of which mind is made, and, in the theory of knowledge, any doctrine which assumes either that "we can only know our own sensations," or that, at any rate, we begin by knowing our sensations and

have to infer from them the character of the physical realities which are their stimuli, must be erroneous. Prof. Stout's criticism appears to show that Prof. Alexander's doctrine cannot be sustained as it stands, but the fact that it can be put forward by a writer of such philosophical eminence is an interesting sign of the influence which Avenarius is at last beginning to exercise on British philosophy.

Very similar tendencies are revealed by Mr. A. Wolf's interesting paper on "Natural Realism and Present Tendencies in Philosophy." The interest awakened by Bergson's striking book "*L'Évolution Créatrice*" is witnessed to by Mr. Carr's disquisition on Bergson's theory of knowledge, and Mr. G. T. R. Ross's treatment of the satisfaction of thinking. Pragmatism, as one would expect, does not go unrepresented. Dr. Schiller inflicts one of those castigations which are becoming periodical with him on rationalism in a paper on "The Rationalistic Conception of Truth," and the subject also figures prominently in a so-called symposium on pluralism, in which different points of view are represented by Dr. Schiller, Prof. Muirhead, and the writer of this notice. The volume further contains an essay on "The Mutual Symbolism of Intelligence and Activity," by Mr. Foston, and a discussion between Prof. Bosanquet, Dr. Sophie Bryant and Mr. G. T. R. Ross on "The Place of Experts in Democracy."

A. E. TAYLOR.

An Introduction to the Study of Biology. By J. W. Kirkaldy and I. M. Drummond. Pp. iv+259. (Oxford: Clarendon Press, 1909.) Price 6s. 6d.

THIS little book represents an attempt to deal, within the limits of some 250 pages, with the study of biology as exemplified primarily by the organisms prescribed in the syllabus of the Oxford and Cambridge Schools' Examination Board. The authors have, however, realised the deficiencies of the type system and endeavoured to "bridge over the gulfs" by brief accounts of, or references to, a considerable number of forms "allied" to the selected types. Thus Monocystis, Hæmamoeba, Bacillus, Chromulina, Actinosphærium, Globigerina, Rhaphidococcus, Arcella, Euglena, Noctiluca, Stytonichia, Acineta, Desmids and Diatoms are all introduced as allies of the more familiar Protozoa, viz. Amœba, Saccharomyces, Sphærella, Vorticella and Paramœcium.

There is no doubt that a too rigid adherence to the type-system does produce a very disconnected idea of the animal kingdom, but we fear that the ordinary schoolboy will think that it is bad enough to have to make the acquaintance of the types without having to shake hands with so many of their relations. No fewer than sixteen types of animals and plants are dealt with in more or less detail, ranging from the Amœba to the dogfish, and from the yeast to the sunflower, besides chapters on the distinction between animals and plants, the life-history of the frog, and the physiology of the rabbit.

The book contains numerous illustrations, for the most part borrowed from very familiar sources; a few are original, but we cannot congratulate the authors very warmly upon these. The picture of a crayfish on p. 112 is extraordinarily crude. The book gives an enormous amount of information gathered from a very wide field, but it is far too concentrated to be inspiring, and the authors do not appear to have succeeded in putting the general principles dealt with in a very clear light. We hope it is intended to be read in connection with a course of practical work, but we have not been able to find any reference to the necessity for such a course.

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LETTERS TO THE EDITOR.

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The End of the Beagle.

IT is well known that Charles Darwin began to advocate his famous doctrine of evolution after his voyage on board H.M.S. *Beagle* as naturalist, in the course of which he went to South America, Africa, and Oceania, and founded the theory of natural selection; but it has been a matter of regret among men of science throughout the world that the famous old ship had passed out of sight. As the result of careful inquiries, however, by Mr. Shigetaka Shiga, a renowned geographer in Japan, it has now been ascertained what was the ultimate fate of the *Beagle*.

Mr. S. Shiga has told the story to the editor of the *Yorodzu Chōhō*, the most popular newspaper in Tokyo, as follows:—"While I was attending the Sapporo Agricultural School some twenty years ago, I read in the *Living Age*, an American literary magazine, that the *Beagle* had been sold in Japan. After my inquiry it was found out that the warship had been bought by the Lord Shimadzu, who had changed its name to *Kenkō-maru*. Afterwards it was purchased by the Naval Department, and kept as a training ship of the Naval School in Tsukiji, Tokyo; but I had then no intention of preserving the famous ship, and so took no notice of the matter.

"This spring I heard Englishmen were sorry at having lost all trace of the *Beagle* at the hundredth anniversary of the great naturalist's birth. I then applied to a steward of Prince Shimadzu, as well as Viscount Captain Ogasawara, to get fuller particulars of the ship. According to the record of the Prince, the *Kenkō-maru* was certainly the *Beagle* that had been built of teak at Liverpool; it was bought for 75,000 dollars in Nagasaki on July 23 in the first year of Gwanji (1864 A.D.). Viscount Ogasawara informed me of the same fact, and added that the Naval Department ordered several officials, Kawamura (the late Count Sumiyoshi), Masuda, and Satō, to receive the same ship from the Shimadzu clan at Shinagawa on June 13 in the third year of Meiji (1870). It was in existence as a training-ship in the thirteenth year (1880), and was re-named *Yeiji-maru* at Yokosuga in the fifteenth year (1882). It was in May of the twenty-second year that the ship was sold by auction for 3276 yen to the late Kikusaburo Oaki, the proprietor of the Oaki Ship-building Yard.

"After some inquiries about the *Yeiji-maru* at Oaki's, I learned that the ship had been broken up at the old Shinagawa Fort, and that her cabin had been preserved for three years, when it was lost sight of; but Mr. Keizo Oaki, the present owner, who superintended the breaking up of the ship as the engineer-in-chief, has had the kindness to make inquiry of the workmen engaged in the work. The result is as follows. A part of the ship was at length discovered. It was being used as a stand for stones which have been piled up near the temple of Suitengu, in the premises of the dockyard. Having been taken out, it was found to be a part of the ribs of the *Beagle*, 3.5 feet in length, 1.5 feet in breadth, and of teak. Thus a portion of the fragments of the famous *Beagle* has at last been found."

TOYOZI NODA.

Ichinoseki, Iwate, Japan, October 27.

The Maintenance of Forced Oscillations of a New Type.

IN a paper "On a Class of Forced Oscillations" published in the *Quarterly Journal of Pure and Applied Mathematics* (No. 148, June, 1906), Mr. Andrew Stephenson discussed mathematically a proposition which may be stated in his own words thus: periodic non-generating force acting on a system in oscillation about a position of stable equilibrium exerts a cumulative action in intensifying or diminishing the amplitude, if its frequency is contained